Amendments to the Specification:

Amend the paragraph beginning at page 3, line 14 as follows:

According to one aspect of the present invention, there is provided a grating, suitable for filtering optical radiation, comprising a plurality of concatenated grating sections, physical characteristics of each section differing from physical characteristics of each adjacent section ~~thereby defining a transition therebetween~~ so that the propagation constants of adjacent sections differ, at least some of the sections each comprising a waveguide structure formed by a thin strip (100) of a material having a relatively high free charge carrier density surrounded by material having a relatively low free charge carrier density, the strip having finite width (W) and thickness (t) with dimensions such that optical radiation having a wavelength in a predetermined range couples to the strip and propagates along the length of the strip as a plasmon-polariton wave~~, said wave being partially reflected at the transition between said waveguide structure and the following said adjacent section, the arrangement being such that reflections at the different said transitions along said grating add constructively~~.

Amend the paragraph beginning at page 4, line 4 as follows:

~~According to a second aspect of the invention, there is provided a grating comprising a series of cells~~ The plurality of concatenated grating sections may comprise a series of cells, each cell comprising two grating sections, said series comprising a first set of cells (Λ_1, Λ_2, ... Λ_5) and a second set of cells (Λ_1', Λ_2', ... Λ_5'), the two sets of cells being different from each other and interleaved alternately cell by cell.

Amend the paragraph beginning at page 4, line 8 as follows:

~~In a preferred embodiment of this second aspect of the invention,~~ Preferably, the first set ~~of cells~~ is equivalent to the second set ~~of cells~~ transposed longitudinally.

Amend the paragraph beginning at page 4, line 10 as follows:

According to a [[third]] second aspect of the invention, there is provided a method of designing a grating suitable for filtering optical radiation within a specified range of wavelengths

and formed from a waveguide strip surrounded by a dielectric material, the method comprising the steps of:

(i) using a numerical analysis method, deriving for said specified wavelengths, a waveguide strip of a particular material, and a particular surrounding dielectric material, normalized phase constant (β/β_0) and normalized attenuation constant (α/β_0) for a particular waveguide strip thickness and each of several waveguide widths, or for a particular waveguide width and for each of a plurality of waveguide thicknesses;

(ii) determining a particular structure for the grating as comprising a series of strips having a predetermined overall length, adjacent strips in the series having different widths, or a series of strips all having the same width and with spaces between adjacent ones of the strips, or a series of strips having spaces between adjacent strips, alternate strips having different widths, and selecting for each of said strips a particular length;

(iii) using the normalized phase constants and normalized attenuation constants derived in step (i), obtaining the complex effective refractive index ($\tilde{n}_{eff} = \beta/\beta_0 - j\alpha/\beta_0$) for each of said strips in said series;

(iv) constructing an equivalent stack of dielectric slabs, each slab taking on the complex effective refractive index of the corresponding strip in said series of strips; and

(v) deriving the optical response of the equivalent stack.

<u>(vi) if the derived optical response is not the desired optical response, repeating steps (ii),(iii),(iv) and (v) with different parameters for the grating;and</u>

<u>(vii) if the derived optical response is the desired optical response, fabricating the grating with said particular structure.</u>

Amend the paragraph beginning at page 13, line 30 as follows:

The reflectance of either of the gratings of Figures 4(a) and 4(b), or other gratings to be described hereafter, was found by applying a full-wave Transfer Matrix Method (TMM) approach. The formulation is based on Maxwell's equations and a detailed description of the approach is presented in reference [12]. It was preferred, in order to adapt the TMM approach, to model the embodiments of the present invention as an equivalent stack of thin dielectric slices, each slice corresponding to one of the grating elements, i.e. either a metal strip or a gap, as shown in Figure 5. Each slice takes on the complex mode effective refractive index[[,]] associated with the fundamental mode propagating in the corresponding waveguide section of the grating <u>or, where the slice corresponds to a space (strip width and thickness equal to zero), the refractive index of the</u>

medium in the space. The complex effective refractive index of the fundamental mode supported by the waveguide is obtained using the MoL as detailed above. The complex effective index was defined as $\tilde{n}_{eff} = \beta/\beta_0 - j\,\alpha/\beta_0$ where β/β_0 and α/β_0 are the normalized phase and normalized attenuation constants, respectively, as obtained using the MoL and plotted in Figures 2(a) and 2(b) as a function of the strip width and thickness. The equivalent stack model adopted herein supports many modes, either a TE (Transverse Electric), a TM (Transverse Magnetic) or a TEM (Transverse ElectroMagnetic) mode. However, the fundamental ss_b^0 mode supported by the rectangular cross-section waveguide is TEM-like in nature as described above. A TEM mode is excited in the equivalent stack model when a plane wave is normally incident upon the stack along the +x-axis as shown in Figure 5.

Amend the paragraph beginning at page 25, line 12 as follows:

~~Photonic bandgap structures~~ A two-dimensional photonic bandgap structure can be created by placing ~~two-dimensional arrays of cells~~ two or more of the periodic structures side-by-side to form a two-dimensional array of unit cells (comprised of strips of various shapes and sizes)~~ over numerous planes separated by dielectric material~~. A three-dimensional array can be created by stacking a plurality of such two-dimensional arrays in numerous planes separated by dielectric material. The size and shape of the strips are determined such that stop bands in the optical spectrum appear at desired spectral locations.

Amend the paragraph beginning at page 29, line 30 as follows:

Figure 25 is a block diagram depicting the disclosed design sequence as applied to the design of all the preferred embodiments described hereinbefore. The design process begins with the definition of the waveguide structure to be analyzed as shown in the top left box of Figure 25. This information is used with our MoL formulation to solve for the dispersion characteristics of the waveguides. As it is impractical to find the modal solutions of a large number of waveguide widths, a cubic-spline interpolant of the geometrical dispersion characteristics of the waveguide is constructed. These are the building blocks for the gratings. Starting in the top right box of Figure 25 the specifications for the grating and the design architecture of interest are selected. As can be seen from the first box, captioned "Define grating specification", the specifications include

Dimension resolution, Center wavelength, Side lobe suppression level, Reflectance level and Bandwidth. It will be appreciated that the dimensions given in the foregoing examples are numerical values rounded to the nearest nanometer. In practice the actual resolution will be determined by the fabrication process to be used. Hence, the first item, "Define resolution" will do so consistent with the fabrication process to be used. The second box, captioned "Select Design Architecture", lists the available architectures from which a selection will be made. As shown in the box captioned "Definition of grating and construction of equivalent stack model", the grating architecture and specifications are combined with the waveguide information and used to design the 'cells' composing the grating and construct the equivalent stack model of the grating using the results from the MoL formulation. ~~The 'cells' composing the grating are designed and the equivalent stack model of the grating is constructed using the results from the MoL formulation.~~ A TMM approach is then used to estimate the spectral performance of the grating using the equivalent stack model. An iterative process can also be applied, as shown, to optimize characteristics. More particularly, as shown by the final box of Figure 25, and the loop back to the box "Definition of grating and construction of equivalent stack model", if the spectral performance of the modeled grating does not satisfy desired specifications, the Definition process, TMM step and Spectral performance analysis may be repeated iteratively, the design architecture being adjusted in each iteration in accordance with the design rules as set out hereinbefore, until a satisfactory spectral performance is achieved.

On page 30, delete the paragraph extending from line 18 to line 20, inclusive.